IN THE CLAIMS

The following listing of claims replaces all previous versions and listings of the claims:

Claim 1. (Currently Amended) A method of horizontally structured CAD/CAM manufacturing, comprising:

identifying a real-world blank for machining;

generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master process model that includesing a the virtual blank, generated from a referenced set of geometries, said the master process model lacking an associative relationship with the a coordinate system, said virtual blank corresponding to said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system; and

deriving manufacturing instructions from said master process model to create a real-world component by machining said manufacturing feature into the real-world blank.

Claim 2. (Currently Amended) The method of Claim 1 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 3 - 8. (Cancelled)

Claim 9. (Original) The method of Claim 1 further comprising creating extracts from said master process model.

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Claim 10. (Previously Presented) The method of Claim 9 wherein said extracts comprise replicated models of said master process model at various operations of said manufacturing instructions.

Claims 11 and 12. (Cancelled)

Claim 13. (Original) The method of Claim 9 wherein said extracts are used to generate manufacturing process sheets.

Claim 14. (Original) The method of Claim 1 wherein said virtual blank is positioned and oriented relative to said coordinate system.

Claim 15. (Previously Presented) The method of Claim 14 wherein said virtual blank is generated as a three dimensional parametric solid model from said reference set geometry.

Claim 16. (Previously Presented) The method of Claim 1 wherein said reference set geometry is defined by dimensional characteristics of a modeled part

Claim 17. (Previously Presented) The method of Claim 1 wherein said coordinate system comprises one or more datum planes.

Claim 18. (Currently Amended) The method of Claim 17 wherein said <u>one or more</u> datum planes comprises:
    a first datum plane positioned and oriented relative to a reference;
    a second datum plane positioned and oriented relative to said reference; and
    a third datum plane positioned and oriented relative to said reference.

Claim 19. (Original) The method of Claim 18 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

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Claim 20. (Original) The method of Claim 1 wherein said manufacturing instructions comprise process sheets.

Claim 21. (Original) The method of Claim 20 wherein said process sheets are linked with numerically controlled tools and a coordinate measuring machine.

Claim 22. (Original) The method of Claim 1 wherein said master process model is linked with numerically controlled tools and a coordinate measuring machine.

Claims 23 - 43. (Cancelled)

Claim 44. (Currently Amended) The method of Claim [44]1 further including modifying a link among a plurality of modeling elements.

Claims 45 and 46. (Cancelled)

Claim 47. (Original) The method of Claim 44 wherein said modifying comprises removing said link among said modeling elements.

Claim 48. (Original) The method of Claim 44 wherein said modifying comprises establishing said link among said modeling elements

Claim 49. (Previously Presented) The method of Claim 44 wherein said modifying links among modeling elements includes substituting another plurality of modeling elements for said plurality of modeling elements.

Claim 50. (Currently Amended) A real-world component created utilizing a method of horizontally structured CAD/CAM manufacturing, the method comprising:
   identifying a real-world blank for machining;

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generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master process model ~~that includ~~esing a ~~the~~ virtual blank, the ~~generated from a referenced set~~ of geometries, ~~said~~ master process model lacking an associative relationship with a~~the~~ coordinate system, ~~said virtual-blank corresponding to~~ said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system; and

deriving manufacturing instructions from said master process model to create a real-world component by machining said manufacturing feature into the real-world blank.

Claim 51. (Currently Amended) The method of Claim 50 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 52 - 57. (Cancelled)

Claim 58. (Original) The method of Claim 50 further comprising creating extracts from said master process model.

Claim 59. (Previously Presented) The method of Claim 58 wherein said extracts comprise replicated models of said master process model at various operations of said manufacturing instructions.

Claims 60 and 61. (Cancelled)

Claim 62. (Original) The method of Claim 58 wherein said extracts are used to generate manufacturing process sheets.

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Claim 63. (Original) The method of Claim 50 wherein said virtual blank is positioned and oriented relative to said coordinate system.

Claim 64. (Previously Presented) The method of Claim 63 wherein said virtual blank is generated as a three dimensional parametric solid model from said reference set geometry.

Claim 65. (Previously Presented) The method of Claim 50 wherein said reference set geometry is defined by dimensional characteristics of a modeled part

Claim 66. (Previously Presented) The method of Claim 50 wherein said coordinate system comprises one or more datum planes.

Claim 67. (Currently Amended) The method of Claim 66 wherein said <u>one or more</u> datum planes comprises:

a first datum plane positioned and oriented relative to a reference;

a second datum plane positioned and oriented relative to said reference; and

a third datum plane positioned and oriented relative to said reference.

Claim 68. (Original) The method of Claim 67 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 69. (Original) The method of Claim 50 wherein said manufacturing instructions comprise process sheets.

Claim 70. (Original) The method of Claim 69 wherein said process sheets are linked with numerically controlled tools and a coordinate measuring machine.

Claim 71. (Original) The method of Claim 50 wherein said master process model is linked with numerically controlled tools and a coordinate measuring machine.

Claims 72 - 92. (Cancelled)

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Claim 93. (Previously Presented) The method of Claim 50 further including modifying a link among a plurality of modeling elements.

Claims 94 and 95. (Cancelled)

Claim 96. (Previously Presented) The method of Claim 93 wherein said modifying comprises removing said link among said modeling elements.

Claim 97. (Previously Presented) The method of Claim 93 wherein said modifying comprises establishing said link among said modeling elements

Claim 98. (Previously Presented) The method of Claim 93 wherein said modifying links among modeling elements includes substituting another plurality of modeling elements for said plurality of modeling elements.

Claim 99. (Currently Amended) A storage medium encoded with a machine-readable computer program code for horizontally structured CAD/CAM manufacturing, said storage medium including instructions for causing a computer to implement a method comprising:

identifying a real-world blank for machining;

generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master process model that includesing a the virtual blank, thegenerated-from-a-referenced set-of-geometries, said master process model lacking an associative relationship with thea coordinate system, said virtual-blank-corresponding to-said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system; and

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deriving manufacturing instructions from said master process model to create a real-world component by machining said manufacturing feature into the real-world blank.

Claim 100. (Currently Amended) The storage medium of Claim 99 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 101 - 103. (Cancelled)

Claim 104. (Original) The storage medium of Claim 99 further comprising creating extracts from said master process model.

Claim 105. (Original) The storage medium of Claim 99 wherein said virtual blank is positioned and oriented relative to said coordinate system.

Claim 106. (Previously Presented) The storage medium of Claim 105 wherein said virtual blank is generated as a three dimensional parametric solid model from said reference set geometry.

Claim 107. (Previously Presented) The storage medium of Claim 99 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 108. (Previously Presented) The storage medium of Claim 99 wherein said coordinate system comprises one or more datum planes.

Claim 109. (Currently Amended) The storage medium of Claim 108 wherein said one or more datum planes comprises:
    a first datum plane positioned and oriented relative to a reference;
    a second datum plane positioned and oriented relative to said reference; and
    a third datum plane positioned and oriented relative to said reference.

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Claim 110. (Original) The storage medium of Claim 109 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 111. (Original) The storage medium of Claim 99 wherein said manufacturing instructions comprise process sheets.

Claim 112. (Original) The storage medium of Claim 111 wherein said process sheets are linked with numerically controlled tools and a coordinate measuring machine.

Claim 113. (Original) The storage medium of Claim 99 wherein said master process model is linked with numerically controlled tools and a coordinate measuring machine.

Claims 114 and 115. (Cancelled)

Claim 116. (Original) The storage medium of Claim 99 further including modifying a link among a plurality of modeling elements.

Claim 117 and 118. (Cancelled)

Claim 119. (Original) The storage medium of Claim 116 wherein said modifying comprises removing said link among said modeling elements.

Claim 120. (Original) The storage medium of Claim 116 wherein said modifying comprises establishing said link among said modeling elements.

Claim 121. (Previously Presented) The storage medium of Claim 116 wherein said modifying links among modeling elements includes substituting another plurality of modeling elements for said plurality of modeling elements.

Claim 122. (Currently Amended) A computer data signal tangibly embodied in a computer-readable medium and propagated over a transmission medium for communication with a computer, said signal including code configured to cause a computer to implement a method for horizontally structured CAD/CAM manufacturing the method further comprising:

identifying a real-world blank for machining;

generating a virtual blank from a referenced set of geometries, the virtual blank corresponding to the real-world blank and lacking an associative relationship with a coordinate system;

creating a master process model that includesing a the virtual blank, the generated from a referenced set of geometries, said master process model lacking an associative relationship with athe coordinate system, said virtual blank corresponding to said real-world blank;

virtual machining at least one manufacturing feature into said virtual blank, each of said at least one manufacturing feature exhibiting an associative relationship with said coordinate system; and

deriving manufacturing instructions from said master process model to create a real-world component by machining said manufacturing feature into the real-world blank.

Claim 123. (Currently Amended) The computer data signal of Claim 122 wherein said associative relationship exhibited between said at least one manufacturing feature and said coordinate system is a parent/child relationship.

Claims 124 - 127. (Cancelled)

Claim 128. (Original) The computer data signal of Claim 122 further comprising creating extracts from said master process model.

Claim 129. (Original) The computer data signal of Claim 122 wherein said virtual blank is positioned and oriented relative to said coordinate system.

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Claim 130. (Previously Presented) The computer data signal of Claim 129 wherein said virtual blank is generated as a three dimensional parametric solid model from a said reference set geometry.

Claim 131. (Previously Presented) The computer data signal of Claim 122 wherein said reference set geometry is defined by dimensional characteristics of a modeled part.

Claim 132. (Previously Presented) The computer data signal of Claim 122 wherein said coordinate system comprises one or more datum planes.

Claim 133. (Currently Amended) The computer data signal of Claim 132 wherein said one or more datum planes comprises:
    a first datum plane positioned and oriented relative to a reference;
    a second datum plane positioned and oriented relative to said reference; and
    a third datum plane positioned and oriented relative to said reference.

Claim 134. (Original) The computer data signal of Claim 133 wherein said first datum plane, said second datum plane, and said third datum plane are orthogonal.

Claim 135. (Original) The computer data signal of Claim 122 wherein said manufacturing instructions comprise process sheets.

Claim 136. (Original) The computer data signal of Claim 135 wherein said process sheets are linked with numerically controlled tools and a coordinate measuring machine.

Claim 137. (Original) The computer data signal of Claim 122 wherein said master process model is linked with numerically controlled tools and a coordinate measuring machine.

IN THE SPECIFICATION

The following paragraph replaces the paragraph corresponding to page 10, line 22 of the specification:

It is also noted that additional datum planes may be added as features to the 3-D coordinate system as children just like any physical feature. These would be added as needed to position other physical features, or to place them on surfaces in addition to the datum plane 4. Any additional face planes needed to mount features should be at the same level as the 3-D coordinate system, that is to say a sibling of the original datum plane 4, not a child of it. In the example shown in FIGs. 1 and 2, such an added plane would be created as a child of the base feature 0 just as the third datum plane 4 is.

The following paragraph replaces the paragraph corresponding to page 12, line 21 of the specification:

It may be beneficial to ensure that the positioning of the base feature 0 with respect to the datum planes 2, 3, and 4 be chosen so as to make the most use of the base feature 0 as an interchangeable element. Note once again from FIG. 1, in that embodiment, the base-level datum plane was chosen to coincide with the center of the cylindrical base feature. By rotating the base-level datum plane symmetrically with the center of the base feature, all progeny will rotate symmetrically about the base feature as well. Differently shaped base features will suggest differently positioned base-level datum planes. In this embodiment depicted in FIG. 4, the physical features, or form features 5a-5g and the datum planes 2, 3, and 4 maintain an associative relationship, but neither with the base feature 0. When the 3-D coordinate system is established before the fundamental shape is placed on the screen and presented to the user, it simplifies substitution of the base feature 0 to other models. For example, where it may be desirable to change one base feature 0 for another, and yet preserve the later added physical features, or form features e.g., 5a-5g. The disclosed embodiment simplifies this process by eliminating the parent child relationship between the base feature 0 and the datum planes. Therefore the base feature 0 may be removed and

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substituted with ease. Moreover, the physical features, or form features 5a-5g and the datum planes 2, 3, and 4 may easily be adapted to other base features of other models.

The following paragraph replaces the paragraph corresponding to page 18, line 10 of the specification:

Referring to FIGs. 8 and 9, to initiate the manufacturing process and virtual machining, once again, a suitable blank may be selected or created, for example, a cast piece, the dimensions and measurements of which, are used as the virtual blank 10 for the virtual machining of the 3-D parametric solid model with the horizontally structured manufacturing method. Alternatively, a virtual blank 10 may be selected, and a blank could be manufactured to match it. This alternative may prove be less desirable as it would incorporate additional machining which would not be necessary if the virtual blank 10 initiates with the blank's dimensions. It is nonetheless stated to note that the method disclosed includes, and is not limited to a variety of approaches for establishing the blank and a representative virtual blank 10 for the model.

The following paragraph replaces the paragraph corresponding to page 18, line 21 of the specification:

For example, in the Unigraphics® environment, a suitable blank or component is selected. A virtual blank 10 is generated therefrom, commonly a referenced set of geometries from a model termed a reference set 26 as shown in FIGs. 8 and 9 (e.g., a built up product model of a part). From this referenced set of geometries 26, a three-dimensional virtual blank 10 model may be generated or created, for example, via the Wave link or Promotion process of Unigraphics®, which includes all of the modeled details of the completed part.

The following paragraph replaces the paragraph corresponding to page 18, line 28 of the specification:

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Once a virtual blank 10 has been established that corresponds to a real-world blank, a horizontally-structured 3-D parametric solid model is generated or created in a manner that describes machining operations to be performed on the blank so as to produce the final real-world part. This horizontally structured model will be referred to as the master process model 20. It is noteworthy to appreciate that the master process model 20 depicted in FIGs. 8 and 9 includes with it, but is not limited to, the virtual blank 10, added manufacturing features 12a-12j by way of virtual machining, and datum planes 2, 3, and 4 all in their respective associative relationships as exhibited from the geometries and characteristics of the reference set 26.

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